

Decentralized Nonlinear Controller Based SiC Parallel DC-DC Converter, Phase I

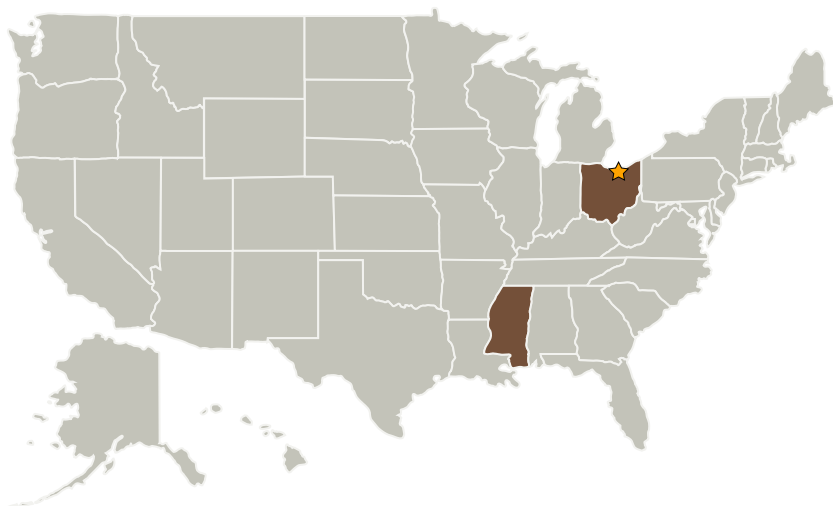
Completed Technology Project (2005 - 2005)



Project Introduction

This proposal is aimed at demonstrating the feasibility of a Decentralized Control based SiC Parallel DC-DC Converter Unit (DDCU) with targeted application for NASA's International Space Station Program and Satellite Power Systems. The proposed DDCU has three key features: a) "true" redundancy for parallel DC-DC converter based on a novel concept developed at the University of Illinois at Chicago, b) a novel nonlinear hybrid controller that achieves enhanced robustness and wider stability margin and yet achieves interleaving to reduce output current ripple, and c) SiC based power stage yielding higher breakdown voltage, temperature-sustenance, and radiation-hardness capabilities for the DDCU leading also to higher power density as compared with Si based power stage.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
SemiSouth Laboratories, Inc	Supporting Organization	Industry	Starkville, Mississippi



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations

Mississippi

Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jeffrey Casady

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.3 Power Management and Distribution
 - └ TX03.3.3 Electrical Power Conversion and Regulation